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FLUOROSCOPY OF THE GASTRO-INTESTINAL TRACT.

REPORT FROM THE KANSAS CITY X-RAY LABORATORY.

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Fluoroscopy was one of the earliest practical applications of the X-ray. However, the value of permanent radiographs in surgical diagnosis, together with a large number of burns of patients and operators in the early fluoroscopic examinations, have been responsible for sufficient adverse criticism to dampen fluoroscopic enthusiasm. The pioneer X-ray operators in Europe and America bear permanent scars that testify to the dangers of unprotected fluoroscopy, but the knowledge regarding the irritative possibilities that has been gained through calamities to pioneer roentgenologists will serve to dispel this fear and establish fluoroscopy in the widening horizon. When we look upon the martyrs of roentgenology, we become reassured, for it is only the pre-protection period roentgenologist or careless experimenter who has furnished us object lessons. We have yet to note injurious X-ray effects upon the roentgenologist who has worked with lead screen and protected tubes. We cannot, up to the present

day, estimate the ultimate effect of the hard, penetrating portion of the radiations from an X-ray tube. We do know the results of continuous or interrupted exposure to the soft rays and are able to guard against them. In no new departure of medicine and surgery has there been so many to enter upon its pursuit with such meager knowledge of its possibilities and dangers. This not only resulted in harm to these neophytes, but has also acted as a hindrance to the propagation of exact roentgen knowledge. There has been, and probably still is, much X-ray work which is carried on with carelessness and ignorance. The scientific application of the X-ray suffers accordingly. The suggestion is then in order that such legislative action be taken as may preclude the use of the X-ray in other than skilled hands. This would mean elimination of the manufacturer, electrician, photographer and others without medical training from a field where only exact knowledge and careful application will eliminate ill-effects.

The gigantic possibilities of fluoroscopy behoove us to pursue its study only with such protected apparatus that no ill-effects may ever be reported. Constant use of and familiarity with fluoroscopic technique may lead one to a carelessness against which the roentgenologist must conscientiously labor. This admonition is likewise applicable to all manner of X-ray application.

A review of the fluoroscopic situation indicates that the American has attempted to promote radiographic technique that would obtain the diagnostic information upon a succession of negatives which the fluoroscope reveals at a glance. There is only one radiographic technique up to the present time that can approach ordinary fluoroscopy; we refer to the Bio-Roentgenography of Rosenthal, Rieder and Kaestle, that roentgen triumvirate of Munchen. The expense of this latter method places it without the realm of practical usefulness.

While the American has been venturing his rapid radiography, the European of France and Germany has been perfecting a fluoroscopic technique that avoids by ample protection the inherent dangers peculiar to the X-ray. The

original fluoroscopic device of the Guilleminot type, with inefficient protection, followed by the cumbersome, protected apparatus of the Albers-Schönberg type, are giving way to the convenient Beclere type. The new Dessauer kliniscop has some advantages over the Beclere. These latter types of fluoroscopic apparatus have the tube in an amply protected, freely movable, X-ray and light proof box, the adjustments of which permit all manipulations of tube and diaphragm by one hand. The lead-glass covered fluorescent screen is adjustable, allowing the patient to be placed either sitting or standing between the screen and the tube box. The Dessauer kliniscop has the advantage of permitting examinations in the recumbent position also, similar to the trochoscope of Haenisch or Holzknecht.

The advantages of fluoroscopy cannot be gainsaid. Radiographic substitutes cannot, in any succession of radiographs, give the diagnostic information that the fluoroscope supplies, without the expense and tedious process of negative development. The inexpensiveness and immediate usefulness of fluoroscopic facts are incontrovertible arguments. The possible dangers can be guarded against by proper protection of patient and operator.

The peculiar superiority of fluoroscopy over radiography depends upon the ability to study the peristalsis and surgical anatomy of the alimentary tract. We may study the physiologic or pathologic conditions which influence the position and relations of the œsophagus, stomach and intestines with reference to the adjacent organs and bony skeleton; the anchorage of stomach and intestines, either normal or influenced by adhesions; the disposal of food in the gastro-intestinal tract; pathological filling defects and abnormalities of contour as presented by alterations in the tissues or interference with muscular function of the gastro-intestinal tract.

The fluoroscopy of the gastro-intestinal tract requires modern protected apparatus. It must be used in a totally dark room that will permit the inspection of the leaded glass fluorescent screen without shading the screen. The bellows type of fluoroscope is not useful in the least; it leads to incorrect

estimates of shadow values and is woefully inexact. It would be splendid if the bellows fluoroscope were eliminated entirely. It is responsible for so many ill-effects and adverse criticisms that we would delight in a bonfire of those now on earth and ostracise the manufacturer of any duplicates.

The author's technique of fluoroscopy consists in the use of the Beclere type of apparatus, in a totally dark room. The current to the tube is controlled by a floor switch, in the primary circuit, which is opened or closed by the foot of the operator. The tube is regulated by a weighted string which operates an adjustment upon the regulating bulb of the tube and is at the right hand of the operator. With the water-cooled tube, regulation is seldom required. We employ a continuous current of water in the tube, after a fashion seen at the Albers-Schönberg Haenisch Institute at Hamburg. This consists of a two-gallon bottle, with a small rubber tubing attached to an outlet in lower segment. This bottle is placed about two feet above the tube. After circulating in the water cooling compartment of the tube, the water runs off through a second tube to a container upon the floor. So much for the regulation of the tube and current.

Into the frame of the lead-glass covered fluorescent screen is fitted with thumb screws a piece of plain glass, upon which may be charted the outlines of the bismuth filled organs and the anatomical landmarks, with blue and red fat-pencils. These charting glasses are readily changed and their markings may be copied later upon thin paper for record. It is poor policy to chart upon the lead-glass of the fluorescent screen, as one will not have time to copy and erase the sketches.

The patient is prepared for the examination by a fast of four to six hours; the removal of the clothing to the hips; metallic markers are placed upon ensiform and umbilicus; the patient may either stand, or sit upon a movable bicycle seat, between the movable tube box and the screen.

For the examination there is required bismuth capsules of varying sizes; paste of bismuth, sugar of milk, and water; bismuth in water, and bismuth porridge. We use a fairly

thick porridge of cream of wheat, into which 40 to 60 gms. of bismuth oxychloride or carbonate is thoroughly mixed. This is the established Riederische mahlzeit, when flavored with raspberry syrup. We prepare this in a chafing dish at the office or in the kitchen at the hospital.

The scheme of Holzknecht for gastro-intestinal fluoroscopy, as outlined in his monograph (1) may be simplified as follows: The patient is placed in the right-anterior oblique position, and offered the small bismuth capsule. When the current is applied he is instructed to swallow. The route and rate of the capsule in the œsophagus are noted until it reaches and passes through the cardiac orifice of the stomach. The succeeding larger types of the capsules are then offered and their course noted. By this means we are able to determine the location and lumen of an œsophageal stricture. The capsules do not always find the orifice of a diverticulum; therefore we employ the bismuth paste, about a level teaspoonful of bismuth carbonate and sac lac, half and half. This is swallowed at the suggestion of the operator after the X-ray is turned on. The use of bismuth and water, two drachms of bismuth to two or three ounces of water, is then employed. By carefully noting the passage of the paste and the water mixture, one can determine the presence of œsophageal strictures, diverticula, abnormalities due to adhesions, cardiospasm, dilatations, pleuritic tugs, œsophageo-bronchial fistulas, carcinomatous filling defects and alterations of outline, pressure of aneuryms or tumors upon the œsophagus. The description of the fluoroscopic symptomatology of each of these conditions is worthy of a distinct and separate descriptive paper.

Personally, we feel that the role of fluoroscopy in gastric diagnosis is most alluring and satisfying. While certain diagnostic phenomena may be obtained from the inspection of a mixture of bismuth and water immediately after its ingestion, one should depend rather upon the Riederische mahlzeit immediately following its ingestion. The phenomena of interest brought out by the water and bismuth are briefly, as follows: 1. The disposition of the mixture by the stomach —whether it immediately reaches the caudal pole and pylorus:

if it does reach the pylorus, does some of it enter the duodenum before the reflex closure of the pylorus is provoked by the ingestion of food into the stomach? Upon this point rests the estimation of a patulous pylorus. Because the bismuth and water does not enter the duodenum at once, one should not assume that there is a stenosis of the pylorus, as the pyloric reflex may have been occasioned by the œsophageal reflex.

Succeeding the fluoroscopy of the œsophagus and stomach by these simple measures, we instruct the patient to slowly eat the ten or twelve ounces of bismuth porridge. This may take some time, as we frequently find gastric patients unused to such food.

To simplify and curtail this paper, we shall list the fluoroscopic symptoms of the more common gastric conditions in which this method offers such valuable diagnostic assistance:

I. Pyloric Stenosis. Fluoroscopic symptoms: 1. Dilatation of the stomach, both longitudinally and transversely. 2. Antiperistaltic waves running from the pylorus to the greater curvature. 3. Interference with the emptying of the stomach, the exit of the food being delayed eighteen to forty-eight hours. Suspicious symptoms which should be noted are: More or less degree of distension of the stomach; weakened peristalsis; food delayed in exit twelve to twenty-four hours; adhesions of the pyloric area, which produce a fixed pylorus; pyloric filling defects; absence of any peristalsis at the pylorus, the wave running only from the greater curvature to the pre-pyloric area.

The pyloric stenosis, whether produced by infiltrations and cicatrices about an ulcer or carcinoma, would produce almost identical symptoms. The differentiation can be determined by the stomach analysis, case history and subjective symptoms.

II. Gastric Carcinoma presents the following fluoroscopic findings: 1. Irregular filling defects in the outline of the stomach wall. 2. Abnormal peristalsis, there being no waves at the site of the filling defect; or, if the carcinoma involves

the pylorus, anti-peristaltic waves are seen. 3. Hour-glass contraction where there is involvement of the middle portion of the stomach. The bismuth meal or water may be seen trickling through the narrowed lumen. 4. Adhesions of the stomach to adjacent organs, due to perigastic inflammation. 5. The lumen of the stomach is usually much smaller than normal, excepting where the carcinoma involves the pylorus we may have a dilatation.

III. Gastric Ulcer. 1. Filling defects, which are not as irregular in outline as in carcinoma, the filling defect being due more to an irritation of the muscular action than to irregular outlines of mass changes in the stomach wall. This interference with the peristalsis in ulcers of the lesser or greater curvature is interesting. Where the ulcer involves the pylorus we have the additional symptoms previously noted when there is interference with the exit of the food.

The pre-cancerous stomach that I offer for your consideration depends upon a clinical symptomatology of chronic gastritis, with loss of appetite, weight, epigastric uneasiness and the craving of small quantities of food, preferably meats. There is no hyperchlorhydria demonstrable. But the fluoroscope will reveal a stomach of lessened lumen, placed rather high in the left hypochondriac region. There is a small magen blase. The pylorus is frequently the lowest point of the stomach shadow, and the filling shadow of the stomach is funnel-shaped. We have here an atrophy of the stomach, dependent upon a certain degree of starvation.

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The author has selected the preceding references from a large number of books, monographs and papers, as embodying the classical features of gastro-intestinal fluoroscopy.—E. H. S.

DISCUSSION

DR. HENRY HULST, GRAND RAPIDS, MICHIGAN.

Fluoroscopy of the stomach has interested me for a long time, but I have not been so situated that I could do much of it. Especially do I feel myself unable to diagnose cancer of the stomach, as a rule. Dr. Skinner did not give us any definite data by which we can diagnosticate this condition. We can get closer to it by means of the X-ray than we can by basing a diagnosis on clinical findings. However, it is rather difficult. I have been able to make the diagnosis in a number of cases where no tumor was present, and operation subsequently confirmed my diagnosis.

I use the fluoroscope in the diagnosis of stomach conditions more than in any other work; I think it is the place for stereoscopic work. The information to be obtained, the location of the stomach, its action, is invaluable and cannot be obtained so well by means of a photograph. Holzknecht is given credit for being the exponent of the cow-horn-shaped stomach. Groedel and Holzknecht both say that the normal stomach is cow-horn-shaped.

A few days ago I was reading a book on Victor Hugo in which it was said that genius is more abnormal than criminality. If this were not true, there would be more poets than criminals, which is not the case. The normal is the average. There is no disputing that if you examine one hundred stomachs as they come to you you will find the cow-horn stomach. Genius is exceedingly rare and the average stomach is not normal. Now, how would I get the normal stomach? I have noticed that in proportion as people are well, as they are robust and well-built, the stomach is located high up. It is oblique in direction. It is without backing. That gave me the idea some two years ago, when I read a paper before this Society, in which I said, show me a Venus or an Apollo and I will show you a cow-horn stomach. Somebody brought in

two Venuses and I found the cow-horn, comma-shaped stomach in both of them. An athletic woman, although forty-five years of age, also showed the cow-horn-shaped stomach. Men very commonly display this—not the atrophied stomach Dr. Skinner was speaking of. Such a stomach I have not seen.

Recently a lady came to me asking for a thorough examination. She thought she had kidney stone, gall-bladder stone and a cervical rib, and many other things. I examined her and found that she had the cervical rib all right, but nothing else. Her stomach was in excellent condition, simply because she herself was in perfect physical condition. That gave the fairly normal stomach. Some one made a diagnosis of gastroptosis in her case. It was not present.

Talking about diseases of the stomach and fluoroscopy, hour-glass stomach is what we all like to diagnose. It is a difficult thing to do. I have done it once or twice. There is a certain thing the Germans pointed out which is not well known. If you pass a stomach tube and instead of going down easily it curls up, then you may well suspect something being wrong. A gastrologist and I were entirely at odds about it. He found a stomach that was too small, a stomach that emptied itself in two ways, a stomach that was not in place. I found the stomach away out of place. I gave the patient some bismuth, the doctor passed a diaphane, and we got a picture which showed the instrument curled up. Do not diagnose hour-glass stomach simply because you have that shape. It is only when it is persistently so that it becomes significant.

One point more. You may get an hour-glass stomach in which the lumen is large enough to pass a good-sized broomstick. You would imagine that there would be no trouble in a case of that kind, that a person with such a stomach would have the advantage over one with an ordinary-sized stomach. Not so. I have been surprised at the great effect that has on the stomach. The mischief that comes from such a narrowing is very striking and hard to explain. The apparatus used in making these examinations varies in the hands of different operators. Dr. Skinner prefers the French type.

Others prefer other types. That matters little, however, providing we are accurate in our technic, and the patient does not get burned. I am using a tube designed originally by Dr. Haenisch, called a trochoscope. I also use the Albers-Schoenberg apparatus, but it is very clumsy. I like them both. The tube stand is clumsy, but if reenforced it is safe. The chair I like very much because it permits of placing the patient in any position desired. I also believe that these examinations can be made with very simple apparatus if one is inclined to do so. To recapitulate: Fluoroscopy of the stomach is something which in the future will be productive of much good. Roentgenography of the stomach will have its place, especially in the work Rosenthal is doing. How he succeeded in making his pictures in the way he did is a mystery to me. He was very fortunate to be able to do it just at the psychological moment and get what he did.

DR. ARTHUR HOLDING, ALBANY, N. Y.

I am very much interested at the attitude men take toward fluoroscopy. I am familiar with the method used by Dr. Skinner. I have a Beclere apparatus and I can go all over the room and try to find a fluorescence, but fail. At the same time I doubt whether it is as safe as we are led to believe it to be, because we cannot protect ourselves against the secondary rays generated by the direct rays, which strike the patient.

Dr. Pfahler has a very clever arrangement which enables him to work through a door. He has come nearer protecting himself against the secondary rays than anyone else.

I think we must make one more step before this method may be considered safe. I believe there will be a combination of the Albers-Schoenberg-Haenisch method with the Beclere method, which will enable you to use it without leaving the room and yet be safe.

We should not swing from the radical American position taken a year or two ago, when we said that we would not own a fluoroscope or look at one, and then come back to our former position. It all depends on whether you are afraid of the secondary rays or not, and whether they have any influence on the trophic functions. That is the question. We must bear that in mind when we are discussing these methods.

As far as the Beclere method is concerned, I think it must still be proved whether it is absolutely safe.

DR. GEORGE E. PFAHLER, PHILADELPHIA, PA.

I have been doing considerable fluoroscopic work during the past three or four years, and I am one of those who is most afraid of the rays. I think we are stepping on very dangerous ground. We should go very slow, be very conservative, and do no fluoroscopic work rather than be rash, do much, and kill more men. Enough men have died as the result of doing this work.

So far I have seen no apparatus except my own that is safe. I think my apparatus is safe, although I cannot go all over the room without being able to see the fluorescence. Those of you who have been in my office know that I have a door that separates one of my working rooms from my dark room. I place on the outside of that door an arrangement to hold my tube. I have a diaphragm sixteen inches square made of one-quarter inch thick lead, which has an opening in the center, five inches square. The entire door is leaded with sheet lead, one-thirty-second inch thick. There is an opening of aluminum just big enough for the rays to go through. I then have a leaded glass screen opposite. The patient steps between the two points, the screen and tube working in unison. When I do my work with the patient in front of that screen of lead, one-quarter inch thick, and I

look through an opening of lead glass just large enough to see through, the side facing my screen is covered with one-quarter inch lead. I have the room as dark as I can get the shadow of my hand through the fluoroscope anywhere.

I have been considered a terrorist by Dr. Holzknecht. I do not want to frighten you. I merely want you to be careful. That is probably secondary radiation. I do not believe that the rays I get in that room are due to primary radiation, but we do not know what secondary rays will do. Therefore, we should do no more fluoroscopic work than is absolutely necessary and essential.

Three days ago a patient came into my office whom I had treated for epithelioma on the back. I had given him five exposures in about six weeks. The epithelioma had disappeared. It was about one inch in diameter. I placed around that tumor a sheet of lead foil with an opening in the center just large enough to surround the epithelioma. I then brought down on this a cylinder of lead, so that the rays that came from my tube simply passed into this space. The diaphragm in the tube was made of one-quarter inch cast iron. The opening beneath the tube is covered by a layer of lead, one-eighth inch thick. I was using a quality of ray that is usually used in the treatment of epithelioma, about 5 Benoist. I had used about twelve units only, twenty being the full dose, yet when that patient returned the other day his skin was pigmented outside of the circle of lead. That proves one of two things—either that sufficient rays passed through the one-eighth inch thick sheet lead to cause the pigmentation of the skin, or else there were enough secondary rays to cause the pigmentation. If that is true, then we must be very careful with our fluoroscopic work. If the secondary rays do this, it shows how very careful we should be.

DR. HENRY HULST, GRAND RAPIDS, MICHIGAN.

A way of detecting the rays is as follows: Electrify a strand of silk and it will stand out straight. Take that strand

of silk into the dark room and it will not fall down. Use it around the X-ray box and it will fall down. I hung it up in the parlor and it would take half an hour before it fell down. I ran the machine and it came down in five minutes. Whether such rays do any harm or not, I do not know.

THE VALUE OF THE ROENTGEN RAY IN THE EARLY DIAGNOSIS OF CARCINOMA OF THE BOWEL.

BY DR. FEDOR HAENISCH, HAMBURG, GERMANY.

I shall endeavor to convince you of the value of screen work in the early diagnosis of carcinoma of the bowel. I have three cases now in which the diagnosis was confirmed by operation subsequently. The technic I used is as follows: I have the patient empty his bowels thoroughly the day before he comes to me and then have him take a high enema on the morning of the day of examination, so that I am reasonably sure that the intestinal tract is absolutely empty. Very often I instruct the patient to take castor oil for several days before the examination. In order to make the examination I place the patient on his back on the trochoscope, a table which I devised for this work and which possesses the advantage that it can easily be moved in any direction with the patient recumbent on it. I then introduce an India rubber tube into the anus, which is fastened to an irrigator. Through this I pass into the rectum a solution of bismuth and bolus alba, a mixture which Gester, of Munich, advocates for this screen work on the bowel. It is impossible to do this work when the bismuth is given by mouth because, as is well known, the bismuth passes from the stomach into the small intestine, and from there into the colon, where it appears to be more or less scattered about without really filling the lumen of the bowel. Therefore, you never judge whether a free space in the skiagram may have been caused by the absence of bismuth or by a stricture or something inside the bowel. Therefore, the bismuth solution must be passed in through the rectum and we must watch it go in, because there is possibility of making an error if this is not done. If you let the mixture pass in without actually seeing it go in, you never know whether the flow was interrupted. I have an arrange-

ment by means of which I cut down the diaphragm of the tube while I am watching the bismuth go in, so that I do not have to expose the entire abdomen to the action of the ray, and still be able to watch the bismuth flow. In cases which were later proven to be positive, so far as carcinoma is concerned, I noticed that the flow of bismuth stopped suddenly and then after a little bit there was a finger-like projection from the bismuth mass which slowly moved onward, and suddenly widened again, filling the colon. I do not let the tube go all the time. I have an assistant stationed at the switch to turn the current off and on, as I need it. Therefore, I do not burn the patient. When there is some doubt I make a skiagram with a short exposure. If the skiagram corroborates what I saw with the screen, I tell the doctor to take his patient home and to bring him back in about two weeks. Then I do the same thing over again and if my findings correspond with that of the first examination, then I am pretty certain to tell the doctor that he is justified in opening the patient's abdomen to see what is the matter. I do not make a diagnosis of carcinoma, because the X-ray plate does not show that, but I do say that there is something wrong in there and that it should be looked after.

The first case I had was one of carcinoma of the sigmoid flexure. The patient was a lady, thirty-three years of age, whose trouble began about a year before I saw her. There were not many symptoms, except sometimes a slight amount of blood in the feces and some mucous discharge. She did not lose in weight and she seemed to be in good health. Now and then she had a little pain in the left side of the abdomen and in the back. Her physician used the X-ray and the screen with the patient in the erect position, but found nothing positive. He brought her to me. I advised an examination, and the result was that I got a picture of a condition such as I have just described to you. I did not attempt to make a diagnosis, based on the findings in the plate alone, because you can find many such openings or breaks in the bismuth flow, but when you watch it go in with the fluoroscope and you see it stop and then you see it go on again in

a thin, finger-like process and widen out, something is wrong. I told this lady's doctor that I felt quite certain there was something the matter. I had the patient return in a week or two, when I made another examination, and saw the same thing again. She was operated on and a small carcinoma was found in the distal end of the sigmoid flexure.

In the next case the findings were practically the same, and in the third case they were duplicated again. In one of the cases the operation showed that there was a carcinoma in the sigmoid flexure and above that a stricture of the ascending colon. I did not diagnose these cases as carcinoma of the bowel, but the clinical symptoms and the X-ray findings were a sufficient reason for telling the surgeon to perform the laparotomy, and the supposition was shown to be correct when the carcinoma was found.

DISCUSSION

DR. GEORGE E. PFAHLER, PHILADELPHIA, PA.

I had a case of this kind recently during Dr. Haenisch's visit to my laboratory. The patient had had symptoms of chronic trouble extending over a period of five years. I gave a course of bismuth by mouth and the trouble seemed to be in the colon, as was seen in the plate and through the screen. The next day I gave a colonic injection of bismuth and then examined the patient again by plate and with the screen. We disproved the findings of the previous day, but on account of gas accumulations we did not know where the disease was. We then used the method just described by Dr. Haenisch, and in the sigmoid flexure we found a constriction of the lumen of the gut, to about the diameter of a thumb. No matter how much we tried to distend the colon below that part, the constriction was not enlarged. We made a probable diagnosis of carcinoma, which was confirmed by operation three days afterward.

DR. GEORGE H. STOVER, DENVER, COLO.

If the bismuth meal were given by mouth and a number of plates were made showing the progress of the bismuth, would there not be an accumulation of bismuth above the stricture?

DR. HENRY K. PANCOAST, PHILADELPHIA.

I would like to know as to the amount of the bismuth mixture Dr. Haenisch employs; what its composition is; how much pressure is used in its introduction into the bowel.

DR. EUGENE W. CALDWELL, NEW YORK CITY.

I would like to ask the details of the administration of oil for emptying the intestinal tract.

DR. LEWIS G. COLE, NEW YORK CITY.

I would like to ask Dr. Haenisch whether in any of the cases he radiographed the patient was placed in any other position, such as the plate before and the tube in front. I have just such a case, and with the tube behind and the plate in front, I get only partial outlines of a constriction, but by reversing the position of the tube and plate I am able to bring out clearly a constriction of the lower part of the sigmoid.

DR. EDWARD H. SKINNER, KANSAS CITY, MO.

Anyone who has had the pleasure of seeing Dr. Haenisch do this work can understand how easy it really is. The possibility of making a diagnosis of stricture of the colon by means of the radiograph is slight. Why? Because frequently one sees in negatives of the colon that just at the point where it crosses the true brim of the pelvis, there is no bismuth, because the colon hangs over it, as one straddles a saddle.

The bismuth drops down on either side, none remaining on the bridge. The point is that you must see the bismuth trickling through the stricture.

DR. HENRY HULST, GRAND RAPIDS, MICH.

If I had heard nothing but this paper, I would have been well repaid for coming here. I had the good fortune of working with Dr. Haenisch's trochoscope for some time, but I have not done any of this work which he has so well described.

DR. HAENISCH (closing).

The mixture of bismuth which I use consists of bismuth carbonate, bolus alba and water. I never use the subnitrate of bismuth because death has occurred following its use. I do not know whether it is as dangerous as has been thought, but recent reports would indicate that danger does attend its use. I take 500 c. c. of warm water and mix from 250 to 300 grams of bolus alba with it, stir thoroughly and then add from 50 to 75 grams of bismuth carbonate, continually stirring this mixture until it is homogeneous, when I add 500 c. c. of water. The important thing is to mix the bolus alba very carefully, so that there will be no lumps in the mixture.

As to the pressure, the water is placed from eighteen to twenty-four inches above the patient. As far as giving this mixture by mouth is concerned, in order to make the method useful, you would have to wait six or seven or even twelve hours until the bismuth had passed into the colon.

Holzknecht says that the peristaltic action of the colon is not slow and continuous, but sudden and interrupted. Whether he is right, I do not know, but he has seen colonic peristalsis twice on the screen. From what I saw once I am inclined to believe that he is right. Before Holzknecht published his paper, I saw the ascending and transverse colon were filled. The descending colon was empty. I switched off my tube, waited a few minutes, switched it on again, and the

ascending colon was filled, but the transverse colon was empty. The descending colon was full. I thought I had made a mistake, but two weeks later I read Holzknecht's paper, and then it occurred to me that my case might be a case in point.

As to emptying the intestinal tract, I leave that entirely to the doctor. I ask him to instruct his patient to have his intestinal tract thoroughly cleaned out before he comes to me. Sometimes they give castor oil and sometimes they give other things.

As to Dr. Cole's question, I have not had the plate at the back and the tube in front, but I will try that way. I do not think I can do that with the same screen I am using now. Besides, I do not rely so much on the plate as I do on the screen. With the patient on the abdomen everything is squeezed together, and I cannot see things so well with the screen as I can when the patient is on his back.

As to Dr. Stover's question, giving the mixture by mouth and watching it pass through the colon, that has been done by someone several years ago. That can be done only in cases where there is a very narrow stricture, in an advanced case, and one can widen the colon above the stricture. The three cases I reported were early cases, the tumors were very small—they could hardly be felt when the body was opened, and there surely could not have been any dilatation of the bowel above the tumor. I saw the stuff go in, stop, and then appear as a thin stream beyond the constriction.

X-RAY FINDINGS IN GASTRIC AND DUODENAL ULCER.

BY HOWARD ELMER ASHBURY, M. D., BALTIMORE, MD.

The writer's intention in presenting this report is to bring before the society a series of experiments and results obtained in the effort to locate gastric and duodenal ulcer by a systematic and constant X-ray technique.

The attempt to recognize and definitely locate gastric and duodenal ulcer has been made by a small number of operators. The results, as far as I can find from obtainable literature, have been unfortunate in so far as they are inconstant.

Dr. J. C. Hemmeter in 1906, before the American Gastro-enterological Association, spoke of the diagnosis of gastric ulcer, successfully seen by means of the X-ray, in animals. He states that the bismuth shadows were not sharply circumscribed; his observations were made with the fluoroscope.

Mathis of Colon was successful in but two cases. He gave bismuth by the mouth for several days and then discontinued it for two days, after which the patient was radiographed. His idea was that a firm crust would be formed in the ulcer and would persist for several days.

Dr. Crane of Kalamazoo states in his paper, "X-ray Evidence in Gastric Cancer," that in ulcer the alteration of form of stomachs is confined to the contracture type of deformed stomachs, and makes no reference to retention of bismuth on the ulcer itself.

Our method in the beginning was to give a single drachm of bismuth sub-carbonate in a glass of water, and to take the picture in a sufficient length of time for the stomach to have emptied itself of the excess, leaving a deposit of bismuth over the surface of the ulcer which could be skiagraphed.

At first we made this period from six to eight hours, but we found this to be too long, the bismuth having had time to get around into the transverse colon and confuse our interpretation, or for the stomach to have freed itself of the small amount of bismuth clinging to the ulcer surface; it was decided that a period representing the time in which a normal stomach would empty itself of food, would be the correct time for making the first exposure.

It was noted that, as a rule, the normal stomach was entirely free from bismuth in from four to four and a half hours; bismuth at this time would be located in the cæcum, entirely out of the stomach region.

The quantity of bismuth sub-carbonate we increased to 90 grains and lessened the amount of water to one-half glass, working on the basis that the smaller amount of fluid would be less liable to wash the bismuth from the surface of the ulcer.

The technique used at this time was: The patient having been on liquid diet for 24 hours, food is restricted entirely for 12 hours; then a drachm and a half of bismuth sub-carbonate is given in a half a glass of water, and the first exposure made from four to four and a half hours later, with the patient lying on the abdomen, the plate underneath, large enough to reach from above the nipples down to below the anterior spines of pelvis; a small marker is placed at the umbilicus, and if there is any special point of tenderness, that is also marked. The exposure is made while the patient holds the breath, at the termination of easy expiration, the time varying from four to ten seconds.

If this plate shows the bismuth sub-carbonate to be distributed over the stomach wall, which is very unusual, a second exposure is made in another hour, at which time we can feel reasonably sure that whatever bismuth is retained is due to either pyloric obstruction, stomach contracture, and if circumscribed to an ulcerated area, the bulk of the bismuth is usually seen in the cæcum.

A number of observations were made in cases of normal stomach and in cases of gastroptosis with intact gastric mucous membrane, and in every case the bismuth was found, on X-ray examination, to have completely left the stomach within four hours of giving it; care should be taken, however, that the stomach is empty at the time the bismuth is given.

It is not improbable that the negative results obtained have been due to allowing too much time to elapse before the X-ray exposure.

In complete pyloric obstruction, where the entire quantity of bismuth is retained in the stomach, the diagnosis of ulcer should be guarded.

In contracture such as hour-glass stomach, the time at which the first plate should be made after the initial dose of bismuth will have to be determined by the clearance time of that individual stomach. I have not had such a case.

In cancer the second plate will clear up the diagnosis, as a rule.

After this examination from one to one and one half ounces of bismuth sub-carbonate is given in a pint of water, and a second picture taken immediately afterwards. This examination has for its purpose, the obtaining of the relation of the stomach to the shadows previously noted (in the first plate), thus determining one of the points directed towards gastric or duodenal ulcer.

If the shadow in the first plate is found directly over the stomach itself, the location is evident; if outside, in the course of the duodenum, the diagnosis of duodenal ulcer is probable, provided accumulations in the colon can be excluded. This is rather difficult at times, and often repeated examinations have to be made to verify the findings. For this reason the diagnosis of ulcer of the duodenum has been made where the first plate failed to show the first dose retained in the ulcer.

The chances of error in ulcers located in the first and fourth portion of the duodenum must be considered, owing to the fact that the duodenum at these points usually lies back of the stomach.

It has been noted in a number of our cases of duodenal ulcer that the stomach assumes an exaggerated horizontal position with the pylorus retracted over to right, in some instances from three to four inches to the right of the median line. In these cases, the stomach is usually high up under the diaphragm, and instead of the skiagraph showing first portion of the duodenum close to the pylorus and above the horizontal plane of the stomach, it is usually absent and when seen is below this plane. We have had occasion to verify this by operation in several cases, the surgeon having great trouble to draw the stomach out of the incision for inspection.

In endeavoring to explain what bearing this position of the stomach may have on duodenal ulcer, I have examined the stomach and colon simultaneously and, as can be seen from one of these slides, the stomach is apparently resting on the transverse colon, which is also higher than the normal; what bearing this has on ulcer of the duodenum, I am unable to say.

By studying the tabulation of the cases examined, it is clear that our endeavors have been, in so far as we have gone, favorable.

It will be seen that the greater number of cases examined were not definitely diagnosed clinically, but were referred for X-ray examination to exclude ulcer; this was taken advantage of as a control for our work.

RECAPITULATION.

The following Recapitulation Tables show a list of 45 cases examined for ulcer, during the period extending from July 19, 1909, to September 7, 1910, the technique being the same in all cases reported.

In the column of Remarks, we have given subsequent information that has helped to verify the X-ray and clinical finding.

TABLE No. 1. DIAGNOSED ULCER BY X-RAY; 18 CASES
Group "A," consisting of 5 cases, verified by operations

No.	Date	Name	Clinical Diagnosis	X-Ray Diagnosis	REMARKS
10	11-17-09 12-26-09 1-22-10 2-28-10	Z. K.	Gastric Ulcer Duodenal Ulcer Duodenal Ulcer Duodenal Ulcer	Duodenal Ulcer Duodenal Ulcer Duodenal Ulcer Duodenal Ulcer	Operation, Gastro-enterostomy, Ulcer located, Cured.
23	3-25-10	J. H. M.	Old Ulcer	Old Ulcer, diagnosed by 2d Plate.	Operation partially healed, Ulcer, Pylorus.
26	4-12-10	F. G.	Gastric Ulcer.	Duodenal Ulcer.	Verified by operation, Gastroenterostomy, Cured.
34	6- 8-10	A. E.	Gastric Ulcer.	Gastric Ulcer.	Operation showed Gastric Ulcer, Pyloric obstruction. Plate taken 8-29-10
45	.....	M. W.	Gastric Ulcer.	Gastric and Duodenal Ulcer.	Both Ulcers located at operation.

Group "B," consisting of 13 cases, verified by subsequent ulcer medical treatment

No.	Date	Name	Clinical Diagnosis	X-Ray Diagnosis	REMARKS
1	7-19-09	L. L	Gastric Ulcer.	Gastric Ulcer.	Cured by subsequent medical treatment.
2	7-19-09	J. F.	Gastric Ulcer.	Gastric Ulcer.	Cured by subsequent medical treatment.
4	8-20-09 9- 3-09	H. H.	Duodenal Ulcer.	Duodenal Ulcer.	Improved by subsequent treatment.
14	12-23-09	S. L.	Gastric Ulcer.	Duodenal Ulcer.	Cured by subsequent medical treatment.
16	1-14-10	L. S.	Gastric Ulcer.	Ulcer of Pylorus?	Cured by subsequent medical treatment.
17	1-17-10 8-13-10	A. A.	Duodenal Ulcer.	Gastric Ulcer.	Improved by Medical treatment, bleeding necessitated transfusion two occasions. Operation not deemed wise owing to severe endocarditis. Unimproved.
30	5- 8-10 8-19-10	M. C.	Ulcer?	Duodenal Ulcer.	Cured by subsequent medical treatment, Plate taken 8-9-10, shows no trace of Ulcer.
33	5-31-10	R. C.	Gastric Ulcer.	Duodenal Ulcer.	Treated for Ulcer. Improved.
28	4-28-10	E. M.	Gastric Ulcer.	Gastric Ulcer.	Narrowing of Pylorus.
40	8- 7-10	L. I.	Cancer.	Duodenal Ulcer.	Improved by subsequent treatment for Ulcer.
44	9- 7-10	A. R.	Duodenal Ulcer.	Duodenal Ulcer.	Refused operation.
42	8-15-10	A. M.	Ulcer?	Duodenal Ulcer.	Unimproved, refused operation.
31	5-28-10	L. K.	Gastric Ulcer.	Gastric Ulcer.	Unimproved after 3 months. Clinical Diagnosis at present doubtful.

TABLE No. 2. ULCER EXCLUDED BY X-RAY; 26 CASES

Group "C," consisting of 5 cases, negative diagnosis of ulcer, substantiated by operations

No.	Date	Name	Clinical Diagnosis	X-Ray Diagnosis	REMARKS
3	8-13-09 8-22-09	W. P. B.	Gastric Ulcer.	Negative.	Operation, Chronic Pancratitus. Improved.
7	9-28-09	S. T. B.	Gastric Ulcer.	Negative.	Operation, Carcinoma of the Cardia. Died.
43	8-20-10	D. S.	Gastric Ulcer.	Negative.	Operation showed Gastroptosis and absence of Ulcer.
11	11-29-09	L. G.	Gastric Ulcer?	Carcinoma.	Operation, Cancer.
21	3-11-10	J. A. B.	Gastric Ulcer.	Pyloric obstruction.	Operation, healed Ulcer.

Group "D," consisting of 16 cases, negative diagnosis of ulcer, substantiated by medical treatment

No.	Date	Name	Clinical Diagnosis	X-Ray Diagnosis	REMARKS
6	9-26-09	J. F. M.	Gastric Ulcer.	Negative.	Normal Stomach.
8	10-16-09	M. N.	Gastric Ulcer?	Negative.	Refused operation.
9	9-16-09	M. V.	Gastric Ulcer?	Negative.	T. B. tudes, refused operation.
12	11-30-09	L. M.	Gastric Ulcer?	Negative.	Dilated Stomach Hyperchlorhydria.
13	12-10-09	W. J. M.	Gastric Ulcer.	Negative.	Malignant growth Lung.
15	1-13-10	J. S.	Gastric Ulcer.	Carcinoma.	A mass can be felt in epigastrium, Patient dying.
18	2- 9-10	H. Y.	Gastric Ulcer.	Negative.	Indigestion, cured.
19	2-25-10	B. E. M.	Gastric Ulcer?	Negative.	Gastroptosis.
20	3- 2-10	E. A. M.	Gastric Ulcer?	Negative.	Gastroptosis.
22	3-15-10	F. V.	Gastric Ulcer.	Negative.	Hodgskin Disease, enlarged spleen.
24	3-31-10	E. H. C.	Gastric Ulcer?	Negative.	Gastroptosis.
25	4- 2-10	U. S.	Malignant Ulcer.	Negative.	Gastric Catarrh.
32	5-18-10	J. W.	Ulcer?	Negative.	Gastroptosis Scoleosis.
36	7-10-10	B. F.	Ulcer?	Negative.	Gastroptosis.
37	7-15-10	B. S.	Ulcer?	Negative.	Enteroptosis.
41	8-15-10	R. T.	Gastric Ulcer.	Negative.	Enteroptosis.

Group "E," consisting of 2 cases, negative diagnosis of ulcer substantiated by autopsy

No.	Date	Name	Clinical Diagnosis	X-Ray Diagnosis	REMARKS
5	8-26-09	L. F.	Ulcer?	Carcinoma of the Stomach.	Autopsy, Carcinoma of Stomach.
27	4-28-10	F. K.	Gastric Ulcer.	Cancer.	Post-mortem Gastric Cancer.

Group "F," consisting of 3 cases, negative diagnosis of ulcer substantiated clinically. Operation for gall stone refused

No.	Date	Name	Clinical Diagnosis	X-Ray Diagnosis	REMARKS
35	6-10-10	H. McC.	Ulcer?	Negative.	Gall Stones.
38	7-29-10	M. B.	Ulcer.	Negative.	Gall Stones.
39	8- 4-10	W. H.	Duodenal Ulcer.	Negative.	Gall Stones.

TABLE No. 3. CASE NOT DIAGNOSED EITHER CLINICALLY OR BY X-RAY; 1 CASE

Group "G," consisting of 1 case

No.	Date	Name	Clinical Diagnosis	X-Ray Diagnosis	REMARKS
29	4-29-10	T. L. S.	Pyloric obstruction.	Pyloric obstruction.	Operation, Duodenal Ulcer causing total obstruction by adhesion.

DISCUSSION

DR. FEDOR HAENISCH, HAMBURG, GERMANY.

I am sorry to say that I do not believe I would dare to base a diagnosis of gastric or duodenal ulcer on very many of the plates we have just seen. About five or six years ago a man called attention to a certain thing. That was Professor Recklinghausen. He found that bismuth was a very good thing for curing ulcers. Another man thought that if von Recklinghausen's statement was true, then to give bismuth by mouth ought to make it stick on the ulcer. So we tried it and after giving the bismuth we had the patient assume a position which we thought would give the bismuth a chance to adhere to the ulcer. However, we soon found out that that was very seldom the case. I have about three cases,

and several others have them also, where we can see a little portion of the bismuth left after the stomach was empty and we hoped that it was what that man talked about, but we soon learned that in order to have the bismuth stick not only must there be an ulcer, but it must be a perforating ulcer, because otherwise the bismuth would not have a chance to stick. Otherwise bismuth would pass out through the stomach in a normal way.

DR. GEORGE E. PFAHLER, PHILADELPHIA, PA.

We should not let this paper pass without pretty thorough discussion. Any of us who have done a great deal of stomach work know very well that we can rarely ever place a patient on his abdomen and take two pictures that would be the same. So that from that point of view you cannot judge, and from the standpoint that the retained bismuth is to be found always in the ulcer, if it is retained at all, it must be due to a spasm and not to the ulcer. In other words, the bismuth is surely not in the ulcer. I am sure that no one has seen an ulcer so large as the quantity of bismuth shown in the plates would indicate. Therefore, we must be extremely careful in work of this kind. I would not in the case of any plate shown have believed, and do not believe now, that there is the least evidence of ulcer. We must be extremely careful about making statements that ulcers can be diagnosed by means of the Roentgen ray. We have all seen such peculiar groupings of bismuth in the stomach, especially when pressure has been brought to bear on the stomach. That emphasizes the importance of fluoroscopic examinations in stomach troubles, and I for one would be willing to discard fluoroscopy in all my work except in stomach and colon cases. I do not believe that this work should be passed unnoticed or uncriticized.

DR. GEORGE H. STOVER, DENVER, COLO.

While I agree with those who have disagreed with the essayist in that it is impossible to state that these spots on

the plates indicate the retention of bismuth in an ulcer, yet we must acknowledge that this work is leading us in the direction where we may eventually arrive at something definite. We find many things to-day that we did not find ten years ago; therefore, it is quite possible that we may find some substance which will adhere to an ulcer or to an ulcerated mucous membrane of the stomach. It may not be bismuth, but something else. Therefore, I hope that Dr. Ashbury will continue his work, because I am sure that he will find something that will adhere to the ulcer.

DR. ASHBURY (closing).

This work was done from a purely humanitarian point of view, with the hope that the X-ray might be used to make a positive diagnosis of ulcer of the stomach and duodenum, a diagnosis which ordinarily is sometimes rather difficult. We tried to do the work as accurately as possible, and the cases I have reported are actual cases, and were reported exactly as we found them. I am sure that in the future we will select the substance which will give us a definite shadow, and I feel that even though these shadows are irregular and may exaggerate the size of the ulcer, it will lead us into a right line of thought later on.

THE UNIVERSAL HAND STEREOSCOPE.

A NEW PLANO-PRISMATIC STEREOSCOPE.

BY H. THRELKELD-EDWARDS, M. D., SOUTH BETHLEHEM, PA.

By way of foreword be it said that the stereoscope, and the other little things exhibited at Richmond, of which I am invited to write a description for publication in the Quarterly, were designed and made for personal use, and, in particular, to aid in Roentgen demonstrations at Medical Society meetings. In a very literal sense, their production was mothered by necessity—for it was only because I needed something which I could neither beg, borrow, nor steal, that I constructed them. From the inception of my work as a Roentgenologist, it had been a matter of surprise to me that the general practitioner did not avail himself—more frequently and more generally—of the Roentgenologist's services in both the diagnosis and treatment of certain chronic cases; for, surely, in no specialist can the man in general practice find a consultant of such all-around value and assistance, in difficult and obscure cases, as the trained and experienced Roentgenologist.

If on the one side I was convinced of the doctor's need of the Roentgenologist, I was equally persuaded, on the other, that the Roentgenologist would not "enter into his own," and receive his just reward, until the general practitioner was made conscious of his need, and it was in furtherance of a Roentgenological "Reciprocity" crusade, that I enlisted my humble efforts, a year or more ago.

Believing that the general practitioner, be he country doctor or city physician, fails to properly appreciate the Roentgenologist and his work only because he is unfamiliar with the present day possibilities of the art, it remained to inaugurate a campaign of education along the line of least resistance; i. e., the County Medical Society.

It was apparent from the outset that the first step in the work of disseminating knowledge of modern Roentgenology

must be to arouse the active interest of the individual doctor in the subject itself; it was also apparent that to do so would call for more than the usual exhibition of radiographic specimens, since even lantern-slides were not appreciated by the profession in general; while the ordinary picture —either plate or print—was surely "flat," if not equally "stale," and without profit. The chance showing at a Society meeting of a few small stereo-prints—reductions made of stereoscopic radiograms for use in a hand stereoscope—aroused such genuine enthusiasm, and led to so active an interest in stereoscopic Roentgenology in general, as to make it evident that one need look no farther for a method of approaching the subject.

A search for a stereoscope to be used in demonstrating a collection of stereoscopic X-ray plates at Medical Society meetings, etc., showing the same to a number of persons, and within a limited space of time—yet insuring satisfactory stereoscopic vision to individuals unfamiliar with stereoscopy—disclosed the fact that no instrument at all suited to the purpose was for sale—either at home or abroad.

Instruments of the Whetstone and Wenckebach type were naturally barred by their size, high cost, etc.

Of the small models, or hand stereoscopes, all specimens offered in this country were of the lens-prism type, and proved useless because of their short focus.

Two models of small size were specially imported, the Pirie from London, and the Lothian from Scotland. The Pirie makes one of a "reflecting" prism of peculiar form—a single glass being inserted in the right-hand tube. At first this instrument gave promise of being useful, until in practice, it was found that not one person in four could successfully use it without preliminary practice; furthermore, its construction was such that unless the interpupilary distance was quite normal, one could not see into the eye-pieces at all. The Lothian (popular in England for viewing small stereoscopic pictures) is optically similar to our small hand stereoscopes; both types using lenticular prisms of various focal length. For this reason, as before stated, they are useful only in near work with small prints, or for lantern-plate transparencies.

The result of ten months' work, with all the available models, and experimenting with various combinations of lenses, prisms and mirrors, is the little instrument herewith described and illustrated.

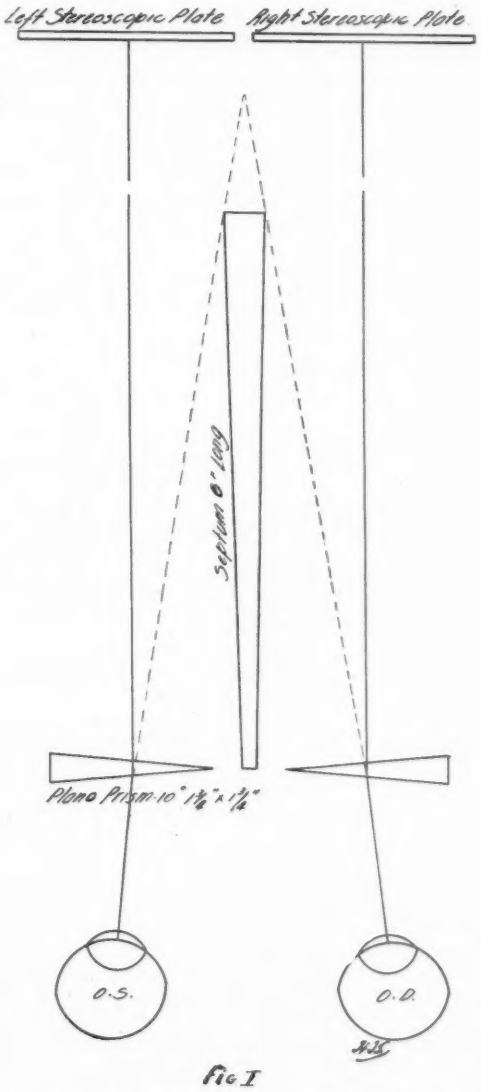


FIG I

Illustrating theory and use of Dr. Threlkeld-Edwards' Stereoscope

As will be seen by referring to the photographs and the line-drawing, the instrument itself is extremely simple in design and construction, and the essayist claims no special creative originality in its evolution. The optical principle involved (See Fig. 1) is properly orthodox and respectably well known —even the architecture is reminiscent of an existing and popular type of hand-stereoscope. Nevertheless, this little stereoscope is, in action, unlike any of its prototypes now used in examining binocular pictures to give them the plastic or perspective effect, so far as my knowledge goes.

While it is quite possible that instruments of this type and contraction may have been made before, and even be in use at the present time, it is certain that there is nothing like it upon the market, or available for general use, anywhere.

Three of these instruments have been in daily use in my laboratory for several months now, and in this time the model has been tested out and compared with other stereoscopes by competent observers—in every way proving itself not only equal, but superior, to the most elaborate and expensive models. Its use is simplicity itself, no practice or experience in stereoscopic technique being required before a clear image in three dimensions is sensed; in this respect and in the clarity and plastic rotundity of the combined image, the Universal is superior to the Whetstone or Wenckebach instrument. There is also no objectionable reversal of planes, as with the former model; and, as no mirrors are employed in the Universal, there are no annoying and troublesome reflections or double images, as occur with both the Whetstone and Wenckebach types.

As both prisms have plane surfaces, the image is free from spherical aberration—so serious an objection when convex lenses of any form are employed.

In case the subjective image is blurred, therefore, the cause should be looked for in the observer's vision, for while it is certain that the eye possesses a wonderful power of accommodation, marked abnormality in vision will undoubtedly result in a certain amount of deviation from the usual binocular effect of this stereoscope—or any other for that matter.

From the foregoing, I think it has been proven that as a practical means for securing binocular vision of pairs of stereo-

scopic plates or prints, the Universal suffers less from optical defects and aberrations in any form than any similar instrument now obtainable, and it is introduced and offered to the profession in the confident belief of its general utility, as well as a trustful hope that it may prove a **sine qua non** in popularizing stereoroentgenology with the medical profession.

In order to facilitate the home construction of this instrument, the following description is made as explicit as possible; exact dimensions and detail explanations being given throughout. If constructed in this way—exclusive of labor—the Universal may be completed at a cost of less than two dollars.

I call the little instrument the Universal stereoscope, because it can be used equally well in examining stereo-negatives of any size, from lantern-slide plates to the fourteen by seventeen inch pictures of the chest and abdomen; or for paper prints, made from the above—either directly by contact, or by the reduction process. In the case of negatives, or diapositives mounted as transparencies, the plates for right and left eye are placed in their proper order before the illuminated back-ground; the right plate in line with the right eye, and vice-versa—both upon a common plane and with the adjacent edges in contact. The matter of properly illuminating the plates by transmitted light is of sufficient importance to be briefly considered. At home I use a large but narrow box, with an opening in front twenty by thirty-six inches in diameter. This is covered by a single pane of opal glass, to evenly diffuse the light from a number of tungsten lamps placed within the box. The interior of the box is lined with asbestos paper, to reflect light, as well as to prevent over-heating. The lamps, in order to preserve their characteristic white light, are controlled by switches and not by rheostats. The glass front is set at a slight angle, with just enough slope to prevent the plates falling forward. Provision is made to exclude any illuminated area, above or to the sides of smaller plates, by curtains of the black rubber cloth used for buggy curtains, etc.

For exhibitions before the County Medical Societies, I make use of a portable rack, similar to the one suggested by Dr. A. L. Gray, and described in the Quarterly for December, 1909. This rack is a most useful addition to the Roentgen equip-

ment, and when properly illuminated by tungsten lamps, at least four sets of stereograms can be simultaneously examined by four observers, each using a Universal stereoscope for this purpose, with the plates arranged with two pairs on either side of the rack; the pairs being separated as far as possible from each other, and a portion of opaque black muslin, or rubber cloth, covering the space between, in order to limit the light, and confine each field of vision to the illuminated area of a single pair of stereograms.

In appearance the Universal somewhat resembles the popular hand-stereoscope known as the Holmes. This type was originally invented by Dr. Oliver Wendell Holmes, and is now used in Roentgenology to give the third dimension to small prints, reduced from regular stereoscopic negatives. The Holmes instrument is naturally restricted to this form of picture, since it uses a pair of prisms with convex surfaces, and this form of prism having magnifying power, has also a fixed focus. This property of the lenses, while enhancing the depth and beauty of the plastic picture produced by the prisms, quite unfits the instrument for any purpose where stereograms of more than three by four inches are to be examined, or when it is desired to examine any size picture, from both near and distant points.

The optical part of the Universal consists of a pair of matched "plano-prisms," of either eight or ten degrees, and in size not less than one and three-quarters inches square. These are set in a wooden frame, with bases out and apices towards the center, where the adjacent edges are separated by the middle part of the frame, three-quarters inch in width. The frame itself is of soft pine, or poplar, one-half inch thick by six inches long and four inches wide; the four corners being rounded until the frame is of oblong or lozenge shape. Two openings or "windows," to accommodate the prisms, are cut, one on each side of the three-quarter inch central portion. The prisms should fit these windows snugly, each being firmly held and supported in the correct position by adjusting small inner frames of aluminum tape around the edges.

An original feature of the Universal is a special septum situate in front of the prisms, and extending forward for nearly seven inches. This septum is essential to prevent

superimposing of the images of the right and left plates, one upon the other. It is made of thin sheet aluminum or light wood, shaped to the form of a prism, with its apex—one-half inch wide—fixed to the frame, in front of and between the prisms. From the frame, it extends along a two and one-half inch base board, for six and one-half inches, ending in a base about one and one-quarter inches wide, forming here the front end of the instrument.

A hood of sheet aluminum surrounds the frame supporting the prisms, its function being to shade the prisms, and the eyes of the observer by cutting off adventitious reflections. To serve its purpose more efficiently, it is made to extend over both sides of the frame and is unlike the hood of the Holmes instrument in this respect. This hood not only acts as a shade, but it is so proportioned in the part extending backwards from the frame, as to maintain a certain distance between the prisms and the observer's eyes, for the stereoscopic effect is best obtained when a space of four inches or more exists between the cornea and the prisms. The hood is cut from a sheet of aluminum (about twenty gauge) twelve and one-half inches long by six inches wide; one side is cut in broad curves to accurately but comfortably fit the forehead and temples, etc.; the other side (to extend in front over the prisms) remains with straight edge. Thus fashioned, the hood is attached to the circumference of the frame by small screws set about one inch apart around the top and sides. In front it extends over the prisms and the apex of the septum for about one and one-half inches, thus effectively shading the glasses by intercepting reflections from above and at the sides, in front. From the back of the frame the hood passes to the shaped edge, measuring at the narrowest portion (the forehead) three inches and at the temples four and one-half. It passes downward around the cheeks to the level of the bottom of the frame and the base board, where a space of three inches between the lower edges is left open for ventilating, and to prevent condensation of expiratory moisture upon the prism surfaces.

A base board to support the septum and frame and to provide attachment to a handle, is cut from a thin piece of white pine, seven and one-half inches long by two and one-half wide, and it is secured to the bottom of the frame by three

flathead screws, which should be countersunk flush with the surface.

In front the base-board extends as far as the base of the septum, the lower edges of the latter being firmly fixed to the board by small screws or flathead brads set at short intervals from apex to base. A thin piece of oak, two and one-half by three inches, to which is attached a hinged wooden handle, is screwed to the base-board, below the frame, and the instrument is complete except for the painting. It must be given a couple of coats of some good black paint, or varnish (one drying with a dull finish), to prevent reflection from the metal surfaces. For this purpose there is nothing better than a mixture of lamp black and shellac (orange or white). Before applying any varnish the prisms must be protected by paper pasted over the surfaces, or the glass will be badly splashed. The black shellac is to be applied with a small bristle varnish brush, evenly to all parts of the instrument—especially to the inner surfaces of the hood, to the sides of the septum and the top of base-board.

The foregoing description applies to the models made last summer, and which I exhibited at the Richmond meeting. Since that time I have added a simple attachment to hold binocular prints, etc., to the forward end of the stereoscope. This consists of a light frame seven by four inches, to hold the cards or glass transparencies; the frame is fixed to three small brass rods—sliding into tubes attached to the septum and base-board in such a manner as to slip in and out when focusing the pictures. Provision is also made to hold extra lenses before the prisms to magnify the pictures.

The salient features of the Universal may be summed up as follows:

It is universal in action, any size plate or print being perfectly seen at any distance.

It is free from optical defects and can be used without practice.

It is light, yet well balanced, and can be held steadily before the eyes for an hour at a time without fatigue of eyes, hand or arm, provided the view box is properly placed in front of the observer.

The prisms are so placed, and of such dimensions, that they accommodate without adjustment all variations in pupilary distances. I have yet to find an individual in possession of even fair vision in both eyes that cannot see a pair of stereo-plates in proper perspective on the first handling of the instrument. In some cases it has been found necessary to carry the stereoscope a little farther away from the plates than is usual, before a beginner can combine the images; but after the plastic picture is once seen, the observer returns to the near view and is able thereafter to examine plates at any distance desired. The long septum effectually prevents superimposing the two images in all normal cases, and eight by ten plates may be correctly viewed from any point between six inches and twelve feet (in the former position the end of the septum will be in contact with the adjacent edges of the plates), but of course there is with every set of stereograms a certain and predeterminate optical distance from which the picture is best seen, depending, no doubt, upon the tube-plate distance of the original exposure. In viewing fourteen by seventeen inch plates it is usually necessary to go back six or seven feet, in order to properly see the whole of the plates at once, though adjacent portions of them may always be viewed at close range.

Fig. 2

Dr. Threlkeld-Edwards' Stereoscope

THE BROMIDE PAPER SCREEN TECHNIQUE.

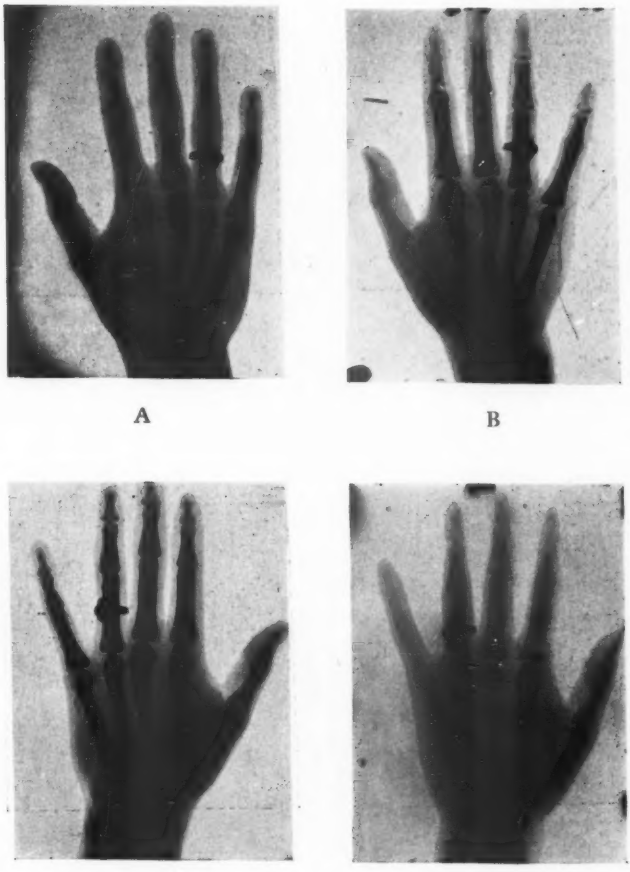
BY LEWIS GREGORY COLE, M. D., NEW YORK.

While the use of bromide paper as a substitute for plates is not new, it having been used as long as ten years ago for direct exposures of extremities, I do not know of its having been used in conjunction with an intensifying screen for more difficult work such as head, kidney, spine and gastro-intestinal tract. The manufacturer of an intensifying screen—practically free from grain—revolutionized radiography. While its greatest application is in the gastro-intestinal radiography, it is not by any means limited to this region, and I am using it, exclusive of lung radiography, more and more extensively for other regions.

The selection of different plates for various types of radiography is being adopted by many radiologists. One kind of plate is used where speed is an important factor and another where contrast and crispness are desired. But very little advance has been made toward obtaining a plate which could be considered strictly an X-ray plate.

One of the principal disadvantages of an intensifying screen is the fact that the X-ray must penetrate either the screen or the plate before reaching the emulsion. While personally I think there is little choice, the manufacturers of the screen advise using the plate in the reverse position, allowing the rays to pass through the plate rather than the screen. The variation in the thickness and compositions of the glass add a variable factor which is much increased when one is using a low vacuum tube. The use of a film of course would overcome this, but it occurred to me that bromide paper with the intensifying screen might be of value, particularly in light work, but I was surprised to see that it was also of value in the more difficult work.

The advantages of bromide paper are that it is lighter, not easily broken, and a dark room is not necessary for develop-

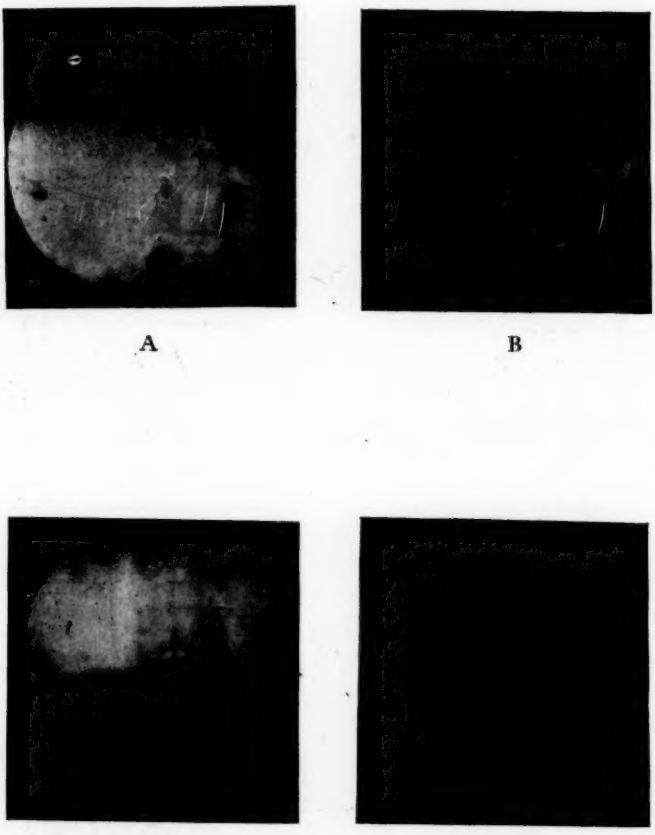


A B

C D

FIGURE 1.

(A) Hand without screen—paper negative.
(B) Hand " " —plate negative.
(C) Hand with screen—paper negative.
(D) Hand " " —plate negative.



A B

C D

FIGURE 2—Trunk region.

(A) Kidney stone—paper with screen.
(B) Kidney stone—plate without screen.
(C) Spine of 200 lb. woman with screen and paper.
(D) Spine of same woman without screen on plate.

ment; it is rapidly developed and fixed, and the rays do not have to penetrate glass before reaching the emulsion; it does not scratch or rub the delicate surface of the screen; it is much less expensive and as many negative prints as are desired may be trimmed and squeegeed on glass and photographed before dry, giving a finished positive reduced print of all the negatives on one print in a few minutes. There are many disadvantages of the bromide negative print, but most of these can be remedied. The most rapid paper that I have yet obtained is much slower than the regular X-ray plates, but undoubtedly this can be improved and I see no reason why any plate emulsion could not be applied to paper. In hot weather the paper is likely to blister, but not more so than a plate is to frill; we are much less accustomed to examining negative prints than we are negative plates; paper is readily torn but this can be prevented by backing prints with cloth.

Figure 1—Illustrates the character of radiograms of extremities made on paper and plates with and without screen. Detail in bone structure is the one place where the screen is at a disadvantage, therefore, while the hand is the easiest of all parts for regular radiographs, it is the most difficult for screen work.

Figure A—Is a radiograph made with bromide paper without screen.

Figure B—Is with a plate without screen.

Figure C—Is with bromide paper with screen.

Figure D—Is with plate with screen.

Figure 2—Illustrates the relative value of paper with screen compared with plates without screen for radiographs of the trunks.

Figure A—Is a radiograph on paper with screen of a large man. It shows two kidney stones and the outline of the kidney.

Figure B—Is the best of several radiographs of the same patient made on plates without a screen.

Figure C—Is a radiograph on paper with screen of the spine of a woman about five feet three who weighed 200 pounds.

Figure D—Is the best of a series of radiographs of the same woman made on a plate without screen.

Figure 3—Shows four radiographs of the stomach of a moderate sized woman; these are made on paper with a screen and demonstrate that even with a slow bromide paper exposures may be made sufficiently short to show the gastric peristalsis.

Figure 4—Demonstrates that even in radiography of the head the use of paper and screen compares favorably with that of plate without screen.

Figure 5—Shows the cæcum, ascending colon and appendix well filled with bismuth solution.

Figure 6—Demonstrates the very great practical value of this method. This case was a young girl who had been shot in the back with a 22 calibre bullet and was practically paralyzed below the waist. The accident happened in the country and in the nearest town to which she was taken only alternating current was available. The examination was made on a bed with a small "dress-suit case" coil and a single cell rectifier. Only two radiographs using paper and screen were made; the first was developed by my assistant in a shaded room, but without a red light, while the second exposure was being made; and the second paper negative was developed in like manner while the third exposure on a plate without a screen was being made; and within three minutes after the second exposure was made, we were studying the bromide negative which is shown in Figure 6—A. This paper negative was carried home in a wet roll and not thoroughly washed until the next day and it has turned yellow which makes reproduction difficult.

Four plates were made and later developed at the laboratory and the best one of the four plates is shown in B, and you will see that the original bromide negative obtained within three minutes after the exposure and developed in a practically darkened cellar compares favorably with the best of the plates.

Figure A—Is a radiograph on paper with screen.

Figure B—Is a radiograph on plate without screen.

While I do not advocate the universal use of paper as a substitute for plates, this article shows that it may be used even on the most difficult cases, but it is of greatest value in cases of foreign bodies or fractures. Where an immediate report

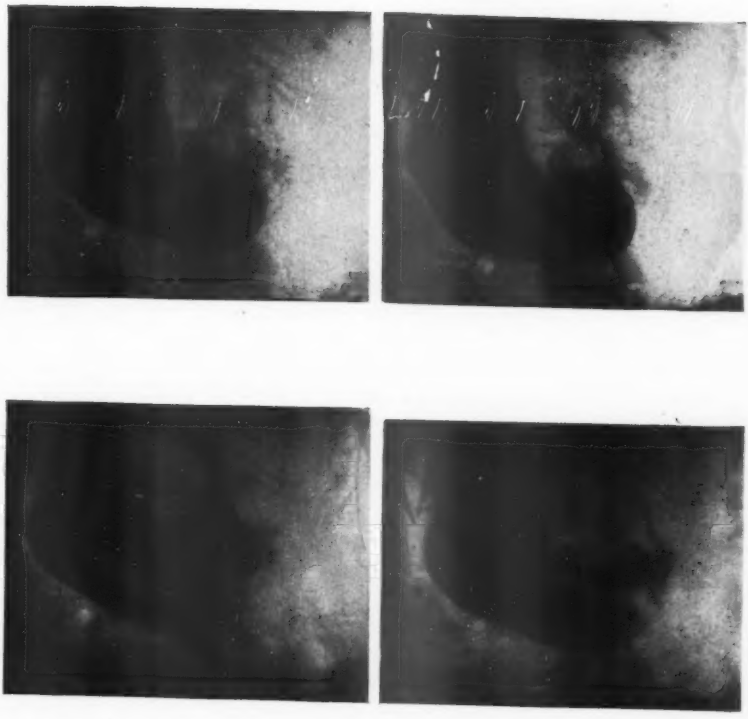
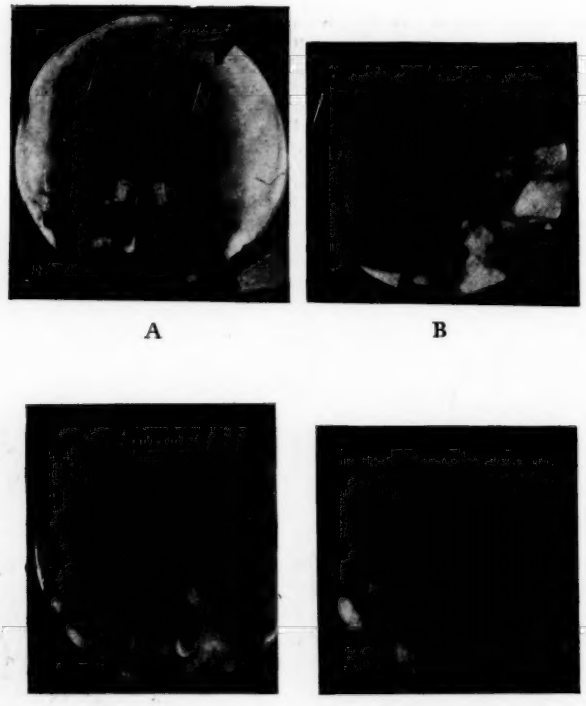


FIGURE 3.

Four stomach plates with paper and screen showing gastric peristalsis.



A B

C D

FIGURE 4.

(A) Antero-posterior head with screen and paper.
(B) Lateral head with screen and paper.
(C) Antero-posterior head without screen and plate.
(D) 'Lateral head without screen and plate.

FIGURE 5—Appendix and colon.

A B

FIGURE 6.

(A) Paper with screen—best of two exposures.
(B) Plate without screen—best of five exposures.

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is desired, the prints can be developed and fixed so rapidly that the first print may be studied while the third is being made, and if the position is not satisfactory it can be altered and another made without delay—it takes the place of a fluoroscopic examination and gives a permanent record.

ARTIFICIAL DILATION OF THE DUODENUM FOR RADIOGRAPHIC EXAMINATION.

BY LEWIS GREGORY COLE, M. D., NEW YORK.

This is a preliminary paper on a method of examination which was described in an article entitled "The X-Ray Diagnosis of Pyloric and Duodenal Lesions," read before the American Association of Obstetricians and Gynecologists at Louisville, September 26, 1911.

The lumen of the entire duodenum can be determined by the following procedure: The patient swallows an Einhorn pyloric dilator. This is a small ball attached to a small rubber tube. Near this ball is a small rubber bag which collapses around the tube just behind the ball. This is as easily swallowed as the "old-fashioned pill" and may be administered with food the day before the examination, or given a short time before the examination when the patient assumes a position which will readily allow it to pass into the duodenum and jejunum.

The small rubber bag, which is surrounded by a silk bag about the size of the lumen of the duodenum, is then inflated with air and acts as an intestinal obstruction; bismuth and buttermilk is then given by mouth and passes readily into the duodenum. The temporary obstruction prevents the bismuth from passing on through the jejunum. The duodenum is dilated by the bismuth and buttermilk and a radiogram shows perfectly the contour of the dilated duodenum. If any portion of the duodenum is held down by adhesions either from duodenal or gastric ulcer, or gall bladder infection, it fails to expand and the constricted area is distinctly shown radiographically. This procedure may be done purely for diagnostic purposes, or the air may then be removed from the rubber bag and the bag withdrawn till it reaches the area of constriction, and that portion of the duodenum bound down by adhesions may then be stretched by inflating the bag with air;

this may be done under fluoroscopic examination. The same procedure is applicable to the pylorus. The advantage of this method is that all friction on the mucous membrane is avoided by not drawing the bag through the duodenum or pylorus while it is inflated with air.

I believe that the following modification of Einhorn's pyloric dilator will be of great value: A second tube slightly larger than the first surrounds it and terminates just behind the rubber bag. Through this tube bismuth and buttermilk, or bismuth suspended in some other fluid may be injected or aspirated directly from the duodenum, and the exact amount of distention of the duodenum thus controlled.

Besides showing adhesions from duodenal and gastric ulcers, and gall bladder infection, the head of the pancreas can be more perfectly outlined by the duodenum as suggested by Doctor Crane, and in some cases the canal of Wirsung may be distinctly shown.

AMERICAN ROENTGEN RAY SOCIETY.

Proceedings of the Twelfth Annual Meeting held in Richmond, Va., September 20-23, 1911, at the Hotel Jefferson, under the presidency of Dr. Percy Brown, Boston, Mass.

First Day—Morning Session.

The Society assembled in the Auditorium of the hotel, and was called to order by the president at 9:30.

The secretary, Dr. F. H. Baetjer, read by title the minutes of the 1910 meeting as published in the Quarterly, December, 1910, and on motion, they were adopted as printed.

The Chair then called for the report of the secretary, and Dr. Baetjer responded as follows:

Mr. President and Members of the Society: Never before has the Society been so well organized as now, and never since its inception has the membership been so representative of the best in roentgenology as now. It consists largely of experts in this field of endeavor and men all of them of high professional standing, and who are possessed by a lively interest in this work. The society is to be congratulated on what it has accomplished in advancing the technical side of roentgenology, and in placing this work on a sound and rational basis as one of the greatest and most valuable specialties of medicine—valuable not only to the professional man but to the layman as well.

The time has come when membership in the society should be regarded as the highest possible reward for work done conscientiously and well. Therefore, I would suggest that some action be taken at this meeting to raise the requirements for membership beyond what they are now,—for instance, to require a thesis from each candidate.

(Signed) F. H. BAETJER, Secretary.

On motion the report was received and ordered published.

The secretary then announced that Dr. Alban Koehler, of Germany, had presented the society with a copy of his book on "Roentgen Procedures."

On motion, the secretary was ordered to convey to Dr. Koehler the thanks of the society for his kind remembrance.

The report of the treasurer was then called for, and Dr. Bowen submitted his report.

On motion of Dr. Stover the report was received, and the suggestions contained therein, as well as the suggestion made by the secretary were referred to a committee for consideration, said committee to consist of the members of the executive committee and two other members to be appointed by the Chair.

The Chair appointed Drs. Stover and D. R. Bowen to assist the executive committee.

On motion of Dr. Caldwell a rising vote of thanks was extended to Dr. P. M. Hickey for his valuable and efficient services as editor of the Quarterly.

Dr. E. H. Skinner here moved that the chair appoint a committee of five to consider the feasibility of the publication of a volume of Transactions of the annual meetings in addition to the Quarterly, the former to contain the proceedings in full, the latter to contain only the papers.

Seconded. Carried.

The Chair appointed on this committee Drs. Thos. F. Stewart, R. H. Boggs, C. E. Coon, P. M. Hickey and D. R. Bowen.

Dr. C. E. Skinner moved that immediately after each annual meeting an alphabetical list of the membership of the society be sent to each member, together with a list of the past and present officers of the society and the dates of their service.

Seconded. Carried.

The Society then arose from executive session and proceeded with the scientific program.

Dr. James W. Hunter, Norfolk, Va., contributed a paper on "The Roentgen Ray in Hypertrophied Prostate—A Therapeutic Study." The discussion on the paper was opened by Dr. Hollis E. Potter, and continued by Drs. Threlkeld-Edwards, Geo. E. Pfahler, A. Judson Quimby and J. W. Hunter.

Dr. Clarence E. Skinner, New Haven, Conn., followed with a paper on "Routine Postoperative Roentgenization in Cancer." The paper was discussed by Drs. Geo. E. Pfahler,

Threlkeld-Edwards, J. H. Edmondson, Thos. F. Stewart, W. S. Newcomet, W. H. Eagar, H. W. Dachtler, J. H. Selby, F. H. Baetjer and C. E. Skinner.

The Society then adjourned until 2.30 P. M.

Afternoon Session.

The Society re-assembled and was called to order by the president at 2.30.

The Chair then appointed the following Nominating Committee: Drs. W. F. Manges, R. H. Hammond and P. M. Hickey.

Dr. Russell H. Boggs, Pittsburgh, then read a paper entitled "Carcinomatosis of Bones, Secondary to Growth in Some Epithelial Organ." The discussion of this paper was participated in by Drs. H. K. Pancoast, Geo. E. Pfahler, Kennon Dunham, F. H. Baetjer, Geo. H. Stover, C. E. Skinner, H. W. Dachtler, J. H. Selby and R. H. Boggs.

Dr. Arthur Holding, Albany, N. Y., followed with a paper entitled "Pathology Revealed by the Roentgen Ray in Cases of Neurasthenia, Neuroses and Other Cases of Indefinite Diagnosis."

Dr. Henry K. Pancoast, Philadelphia, contributed a paper on "The Importance of Dental Defects as Factors in the Etiology of Idiopathic Epilepsy." These two papers were discussed jointly by Drs. E. H. Skinner, Kennon Dunham, Geo. C. Johnston, Geo. E. Pfahler, D. R. Bowen, C. E. Coon, Threlkeld-Edwards, Geo. H. Stover, Arthur Holding and Henry K. Pancoast.

"Roentgencinematography" was then discussed by Dr. Sidney Lange, of Cincinnati, followed by Drs. Caldwell, W. F. Manges, Geo. H. Stover and Lewis G. Cole.

The Society then adjourned until the following day at 9:30 A. M.

At 8 o'clock in the evening of this day, September 20th, the society and its guests assembled in the auditorium to attend an open session presided over by Dr. George Ross, president of the Richmond Academy of Medicine. Addresses of Wel-

come were delivered by the Honorable Wm. Hodges Mann, Governor of Virginia, for the State; Honorable D. C. Richardson, Mayor of Richmond, for the City, and Dr. Stuart McGuire, for the profession of Richmond.

Responses on behalf of the Society were made by Dr. Percy Brown and Dr. Geo. C. Johnston.

A reception and luncheon given by the City of Richmond concluded the festivities of the evening.

Second Day—Morning Session.

The Society convened at 9:30 and was called to order by the president, Dr. Brown.

A paper, entitled "Laboratory Notes" was read by Dr. D. R. Bowen, Philadelphia, and was discussed by Drs. P. M. Hickey and Geo. E. Pfahler.

Dr. George E. Pfahler, Philadelphia, followed with a paper on "The Variability of the Focus of the Roentgen Ray Tube and a Simple Means of Selecting a Picture Tube." The paper was discussed by Mr. H. Clyde Snook, Drs. H. W. Dachtler, Sidney Lange, F. H. Baetjer, E. W. Caldwell, C. L. Leonard, Lewis G. Cole, P. M. Hickey, A. J. Quimby, W. H. Eagar and Geo. E. Pfahler.

Dr. Pancoast, chairman of the committee appointed to consider the suggestions contained in the reports of the secretary and the treasurer, reported as follows:

Your committee has carefully considered the suggestions made by the secretary and the treasurer in their reports to the society read yesterday, and begs leave to report that it is the opinion of the committee that hereafter applicants for membership in the society shall subscribe to the following rules:

MEMBERSHIP.

1. Form of application blank suggested.

Date.....

Name .....

Birthplace .....

Age .....

Residence .....

Medical Degree obtained at .....
Collegiate or other degrees .....
Served as interne in the following Hospitals: .....
.....
.....
Years in practice of medicine .....
Knowledge of Roentgenology obtained where.....
.....
Years of practice of Roentgenology .....
Extent of practice outside of Roentgenology .....
.....
Other specialties practiced .....
Present Hospital and Medical College connections.....
.....
Membership in learned Societies .....
Bibliography .....

Signed by two members in good standing and acquainted with applicant.

Accompanied by letters of recommendation from—(*a*) Those who sign. (*b*) At least one practicing physician or surgeon in good standing residing in applicant's immediate vicinity.

REQUIREMENTS FOR MEMBERSHIP.

1. Applicant must have been a graduate in medicine and have been engaged actively in X-Ray work for at least two years after his graduation, and must submit a scientific paper on Roentgenology to Executive Committee, which, if approved, may be published in the Proceedings of the Society.

2. Send to Chairman Executive Committee at least six months before next meeting at which it is to be acted upon.

3. Publish names and signers' addresses in Quarterly or by letter at least twice before meeting at which they are to be acted upon. Objections sent to Chairman Executive Committee as soon as possible for filing.

4. Read names and proposers before meeting before they are acted on by Executive Committee.

5. Executive Committee to hold over any applications for further consideratjon that are—(*a*) Not made public according to above. (*b*) Not entirely satisfactory or insufficient data at hand.

6. Executive Committee to have power as heretofore to reject.

7. Voted for by secret ballot.

8. Applicants are privileged to attend meeting as guests.

On motion of Dr. Manges, the committee was empowered to print its report for immediate distribution to the members present at the meeting, and that the consideration of the report be made a special order of business at 10 A. M. on the following day.

Seconded. Carried.

Dr. F. H. Baetjer here proposed to amend Art. III, Section 3, to read so as to authorize the treasurer to drop from the membership roll all those who are delinquent six (6) months after the annual meeting.

Dr. E. H. Skinner proposed to amend Art. III, Section 3 as follows:

No member who is in arrears for annual dues shall vote, hold office or be entitled to receive the transactions. It shall be the duty of the treasurer to erase from the rolls of membership the name of every person who is in arrears for one year, thirty (30) days after the receipt of a registered letter by said member, such action to be reported at the next annual meeting for confirmation.

The Society then adjourned until 8:30 P. M.

In the afternoon the members and guests were given an automobile ride through the city of Richmond by the local committee of arrangements and their friends. This was followed by a tea at the Country Club of Virginia.

Evening Session.

The Society re-assembled and was called to order by vice-president E. H. Skinner at 8:30.

The president, Dr. Percy Brown, then delivered his address, entitled "The Interrelation of Roentgenology and the Law."

Dr. Eugene W. Caldwell, New York, followed with a paper on "The Roentgen Laboratory in the Hospital and Medical School." The discussion on this paper was participated in by Drs. H. K. Pancoast, Lewis G. Cole, F. H. Baetjer, Geo. E. Pfahler and E. W. Caldwell.

The president here took the Chair, and the Society then went into executive session.

Dr. Geo. C. Johnston, on behalf of the Board of Censors, presented the following report:

The Board of Censors of the American Roentgen Ray Society regrets to report that incontrovertible evidence has been submitted that Dr. J. Rudis-Jicinsky, of Cedar Rapids, Ia., has been guilty of gross intentional fraud, practiced on a patient, same consisting of the substitution of radiograms of dry bones and anatomical specimens instead of the real radiograms supposed to have been made by him of a patient under examination, later examination revealing entirely different pathologic conditions present. The prints submitted as evidence and given to the patient as true Roentgen pictures of himself are those of portions of the skeleton, the bones of which have been fractured artificially, and the skeleton that of a person of entirely different size and stature and sex. The prints do not represent what they are stated to be.

The Board of Censors therefore recommends that the above mentioned J. Rudis-Jicinsky be expelled from membership in the American Roentgen Ray Society and that notice of such action be sent to the Iowa State Medical Society with copies of the evidence submitted to the American Roentgen Ray Society.

(Signed) GEO. E. PFAHLER,
EUGENE W. CALDWELL,
GEO. C. JOHNSTON.

On motion of Dr. Dunham the report was accepted and the secretary instructed to carry out the wishes of the society as expressed in the report. Carried.

The question of incorporating the society was then brought up for discussion. On motion the entire matter was referred to the Executive Committee with instructions to report at the next annual meeting.

The society then adjourned until 9:30 A. M. the next day.

A lantern slide demonstration by various members, with informal discussion, followed.

Third Day—Morning Session.

The society re-assembled at 9:30 and was called to order by the president.

Dr. A. Judson Quimby, New York, read a paper entitled "Some Observations on the Multiple Spark Gap in Series with the Roentgen Ray Tube."

Dr. Joel E. Goldthwait, Boston, followed with a paper entitled "The Importance of the Proper Understanding of the Relation of the Anatomic Viscera in the Treatment of Autointoxication and Autoinfection." The discussion was participated in by Drs. Percy Brown, Geo. E. Pfahler, Arthur Holding, C. L. Leonard, F. H. Baetjer, C. E. Coon, P. M. Hickey, K. Dunham, W. H. Eagar, R. H. Hammond and J. E. Goldthwait.

On motion of Dr. Leonard, a vote of thanks was extended to Dr. Goldthwait for his splendid contribution.

On motion, the society then went into executive session.

Dr. Holding moved the consideration of the report of the committee on the reports of the secretary and the treasurer. Seconded. Carried.

This was done, and the report was adopted.

On motion of Dr. Holding the Executive Committee was instructed to act on the applications received prior to this time on the basis of the former requirements for membership.

Dr. F. H. Skinner's amendment to Art. III, Section 3, was then read and adopted as presented.

This action made unnecessary a vote on Dr. Baetjer's

amendment of the same Article, therefore Dr. Baetjer withdrew his amendment.

Dr. P. M. Hickey then offered the following amendments:

Article V, Section 5: Add, "The new member of the Executive Committee to be elected by ballot, the polls to be open at the registration bureau for twenty-four hours; the one receiving the highest number of ballots to be declared elected."

Article V, Section 5: Add, "and shall transact the business of the society."

Article VI: Add, "and there shall be one executive session."

Dr. Leonard moved that the Chair appoint a Committee on Index from a group of volunteers. Seconded. Carried.

The society then arose from executive session and proceeded with the scientific program.

Dr. P. M. Hickey, Detroit, contributed a paper on "The Roentgen Diagnosis of the Position in Pregnancy," which was discussed by Drs. W. F. Manges, Geo. E. Pfahler, J. H. Selby, H. W. Dachtler and P. M. Hickey.

Dr. Chas. F. Bowen, Columbus, read a paper on "The Use of the Fluoroscope as a Guide for the Bronchoscope and Esophagoscope in the Removal of Foreign Bodies." The paper was discussed by Drs. Geo. C. Johnston, K. Dunham, C. L. Leonard, Geo. E. Pfahler, W. F. Manges, P. M. Hickey, W. S. Newcomet, Lewis G. Cole, J. H. Selby, Sidney Lange, Geo. C. Johnston, H. E. Potter and C. F. Bowen.

The society then adjourned until 2:30 P. M.

Afternoon Session.

The society reassembled and was called to order by the president at 2:30.

The Executive Committee recommended that the next annual meeting of the society be held at Niagara Falls, N. Y.

On motion, this recommendation was accepted.

The Executive Committee then proposed to amend Article IV of the constitution by adding the word "librarian" after the word "treasurer."

A motion by Dr. Johnston to the effect that at the next annual meeting no evening sessions be held was both seconded and carried.

Dr. Chas. L. Leonard, Philadelphia, then presented a paper on "The Compensating Displacements of the Thoracic Viscera in Pulmonary Tuberculosis." The paper was discussed by Dr. Sidney Lange.

Dr. W. F. Manges, chairman of the Nominating Committee, submitted the following report:

President: Frederick H. Baetjer, Baltimore; vice-presidents, H. W. Van Allen, Springfield, Mass., G. M. Steele, Oshkosh, Wis., J. H. Edmonson, Birmingham, Ala., W. H. Eagar, Halifax, N. S., and Hollis E. Potter, Chicago; secretary, H. K. Pancoast, Philadelphia; treasurer, Chas. F. Bowen, Columbus, Ohio; member of Executive Committee, Alfred L. Gray, Richmond, Va.; Publication Committee, P. M. Hickey, Detroit, Sidney Lange, Cincinnati and D. R. Bowen, Philadelphia.

On motion, the report was accepted, and the president instructed to cast the ballot of the society for the election of the nominees, which he did, and they were declared duly elected.

Dr. Kennon Dunham, Cincinnati, then read a paper on "Studies of Roentgen Ray Chest Plates of Tuberculosis."

Dr. Geo. H. Stover, Denver, read a paper on "Roentgenographic Diagnosis of Ureteral Kinks causing Hydronephrosis."

Dr. J. Hunter Selby, Rochester, Minn., followed with a paper on "Collaboration Essential in the Diagnosis of Surgical Conditions of the Kidney and Ureter."

Dr. Stover's paper was discussed by Drs. Selby, Brown and Stover.

Dr. Selby's paper was discussed by Drs. E. W. Caldwell, Percy Brown, C. L. Leonard and J. H. Selby.

Dr. Edward E. Skinner, Kansas City, Mo., contributed a paper entitled "Duodenal Diagnosis." The paper was discussed by Dr. Pfahler.

Dr. Threlkeld-Edwards, So. Bethlehem, Pa., then exhibited a portable stereoscope and a convenient, practicable plate marking system by means of aluminum tags.

The society then adjourned until the next day at 9:30 A. M.

In the evening the society was entertained at a reception held at the Commonwealth Club. A very pleasing program contributed in large measure to the pleasure of the evening.

Fourth Day.

The society re-assembled and was called to order by the president at 9:30.

The Executive Committee reported favorably on the applications for membership of the following:

E. T. Brady, Roanoke, Va.; Lester W. Cunningham, Jacksonville, Fla.; Anna K. Davenport, San Francisco; Paul Eisen, Milwaukee; James S. Eldredge, Kansas City; Arthur C. Heublein, Hartford, Conn.; George Winslow Holmes, Brookline, Mass.; Charles Wentworth Hoyt, Rochester, N. Y.; O. H. McCandless, Kansas City; Hugh J. Means, Columbus, Ohio; Alfred G. Nadler, New Haven, Conn.; John E. Short, Canton, Ohio; Albert Soiland, Los Angeles, Cal.

On motion the report was accepted and the secretary instructed to cast the ballot of the society for the election to membership of the applicants named, which he did, and they were declared duly elected.

Dr. Thos. F. Stewart, chairman of the reference committee on publication, reported that the committee suggested that the committee on publication be instructed to publish the proceedings of the society as soon as possible after the meeting, that the Quarterly be continued and also contain abstracts of the leading roentgenologic papers published in other journals.

On motion, the report was accepted and the committee on publication instructed accordingly.

The amendment proposed by Dr. Hickey with reference to the election and duties of the Executive Committee was again read and on motion of Dr. Pfahler was adopted.

The amendment introduced by Dr. Hickey entrusting the Executive Committee with the transaction of the business of the society was then read, and adopted on motion of Dr. Dunham.

The amendment introduced by Dr. Hickey providing for

one executive session at each annual meeting was also read, and on motion of Dr. Pancoast was laid on the table.

The amendment introduced by the Executive Committee creating the office of librarian was read, and on motion of Dr. Stover was adopted.

The Nominating Committee, through its chairman, Dr. Manges, proposed the name of Dr. H. W. Dachtler for the office of librarian, and on motion of Dr. Pancoast, the secretary was instructed to cast the ballot of the society for the election of Dr. Dachtler to this office, which he did, and Dr. Dachtler was declared duly elected.

Dr. Chas. L. Leonard: We have been the participants of hospitality here during this meeting which is unique in the history of the society. It was hospitality typical of the South. We have partaken of all the sweets of a Southern welcome—to say nothing of the sora. Sora soar high—but far above them will soar our appreciation of the hospitality of Richmond and its warm-hearted people. We cannot express our thanks fittingly. Words fail me; but we have tried to show our appreciation by the measure of our enjoyment. Now, I move you, Sir, that we extend to the local committee of arrangements, to the local members of the profession and to the people of Richmond who contributed so freely and heartily to our pleasure a rising vote of thanks. (Applause).

The motion was duly seconded and carried with cheers and applause.

After a few well chosen words on his own behalf, expressing his pleasure and appreciation of the valuable and willing aid given him by the members of the society, the president, Dr. Brown, introduced the president-elect, Dr. F. H. Baetjer, to the society. (Loud applause.)

Dr. Baetjer: Mr. President and Members of the Society: In selecting me as your president from among so many men more worthy of the highest office in your gift, you have overwhelmed me. It is, indeed, an unexpected honor, one which, I fear, I little merit, but I shall endeavor to live up to your expectations and, if possible, emulate the splendid example

set by our retiring president, Dr. Brown. I appreciate this honor more than I can tell you. (Applause.)

Dr. Stover moved a rising vote of thanks to Dr. Brown for his untiring and efficient services on behalf of the society.

Seconded and carried with ringing rounds of applause.

The scientific program was then taken up.

Dr. Roland Hammond, Providence, R. I., read a paper entitled "The Control of Fracture Work by the Roentgen Rays." The paper was discussed by Drs. A. Holding, Lewis G. Cole, F. H. Albee, Geo. C. Johnston, Cotton, C. E. Coon and R. Hammond.

Dr. Fred H. Albee, New York, followed with a paper on "The Roentgen Ray in Certain Hip Conditions."

Dr. Hollis E. Potter, Chicago, contributed a paper on "The Neuropathic Spine (Charcot); Pulmonary Metastases from Papillomatous Cysts of the Ovary," which was discussed by Drs. Baetjer, Ashbury and Potter.

There being no further business to come before the society, it adjourned, subject to the call of the Executive Committee.

PERCY E. BROWN, M. D.,
President.

FREDERICK H. BAETJER,
Secretary.

ABSTRACTS FROM FORTSCHRITTE AUF DEM GEBIETE DER RONTGENSTRAHLEN BAND XVI NO. 4 & 5 BAND XVII NO. 2.

Influence of the Roentgen Ray upon Pus-Formers from the Horse.

BY DR. WALTER BAYREUTHER.

The following conclusions are drawn:

1. Contrary to most experimenters, the author was able to produce slight inhibition in the growth of staphylococcus aureus and albus, bacillus pyocyanus by ordinary therapeutic doses of the X-ray.

2. To produce similar effect upon streptococcus pyogenes six times the erythema dose was required.

3. Whether the virulence of the bacteria is affected is doubtful.

4. Doses up to fourteen times the erythema dose failed to kill the germs.

5. There was no latent period between exposure and maximum effect.

6. Close to the tube, electrical discharge and secondary rays are probably bactericidal.

7. Fluorescent light has no effect upon bacteria.

First Report of the Recognition of the Different Heart Cavities upon the Radiograph during Life and Calcareous Deposits in the Heart Outline.

BY F. M. GROEDEL.

A radiograph of a woman twenty-nine years of age is presented in which the outline of the left auricle and left ventricle can be distinguished. Also a large calcareous plate which the author believes represents a degenerative process in the pericardium.

Compression Fracture of the Ossification Nucleus of the Tarsal Scaphoid.

BY DR. STUMME.

Compression fractures of the scaphoid bone of the foot are a common observation in adults. In children, however, the condition is not common and is often overlooked because the injury produces usually a flattening of scaphoid nucleus and not a distinct fracture. The condition was first described by Kohler (Kohler's bone-disease), the present report being the fourth case on record.

The Early Stage of Spondylitis Deformans.

BY DR. ERICH PLATE.

Concerning this condition which is met with so frequently in routine X-ray work, the author concludes that:

1. Many cases give rise to no symptoms.

2. Trauma plays a great part in developing and continuing this condition, especially when the spine has not its normal movements, when static relations are changed, or when the protection of a powerful musculature is absent.

3. Since it is possible to recognize it early by the X-ray we must look for it even under fifty years.

4. Symptoms tend to disappear and recur.

5. Heat, counter-irritation and a supportive corset are important in the treatment.

Tuberculous Lung Involvement upon the Radiogram and Its Anatomic Basis.

BY DR. VON DEHR.

In order to make comparison between the shadows upon the radiograph and the findings upon dissection of the lung, the author made a series of observations upon cadavers, first radiographing the chest and then verifying the shadows by

autopsy. Some discrepancies were found. In one case what appeared to be small calcified nodes proved to be deposits in the costal cartilages, while enlarged glands in the lung hilus failed to show on the plate. He found that cancer nodes and fibrous scars can give a diffuse shadow resembling fresh infiltration. Because of the superimposition of tissues and summation of shadows, the significance of the hilus shadows may be doubtful and anthracitic glands may give the same shadow as tubercular glands. While taking cognizance of the fact that the physical conditions in the living chest differ greatly from those in the cadaver, yet the author warns against regarding the radiograph as absolutely reliable in incipient and latent tuberculosis.

Estimation of Size of Stomach by X-Ray.

BY DR. KLAUS HOFFMANN.

A comparison of the bismuth method with that of inflation was made. Fluoroscopic tracings were made with the trochoscope in both erect and recumbent positions, first with stomach inflated and then with the bismuth meal.

As standards of measurement, the following were adopted:

1. Greatest vertical diameter.
2. Greatest horizontal diameter.
3. Distance of lower pole above umbilicus.

Considerable differences were found in the estimations by the two methods.

In the recumbent position inflation gave a better idea of the stomach outline than the bismuth meal since with the latter the pyloric portion was often unfilled. In the erect position the bismuth filled out the stomach best and of course showed the lower pole and pyloric portion best. The author found that occasionally the bismuth would not fill out the entire stomach, especially if large but would settle in the pyloric portion and would not distend the upper pole so well as inflation. He concludes that both methods should be used conjointly.

Effect of X-Rays upon Garden Earth.

BY DR. ALBERS-SCHONBERG.

Flower pots containing ordinary garden earth were exposed to 18 X (Kienbock units). Immediately thereafter peas, beans and cress were planted in the various pots. At the same time control seeds were planted in unexposed pots.

Without exception the growth in the exposed earth was stimulated. The sprouts appeared several days earlier and in greater number in the exposed earth than in the controls. The plants in the exposed pots were for the most part larger and bloomed earlier than in the controls.

Another pot of earth was then exposed more vigorously, turning the earth over during the exposure. The seeds planted here were retarded in their growth as compared to the controls.

The author (while recognizing that the experiments require further confirmation) suggests that moderate doses stimulate and heavy doses diminish the fertility of the soil. The effect of the X-ray he believes to be either chemical or upon the bacteria of the soil since he showed that the exposed earth did not become radio-active.

Milliamperemeter and X-Light.

BY WERTHEIM-SALOMONSON.

The experiments were undertaken to determine the accuracy of the milliamperemeter as a measure of dosage. In using the milliamperemeter reading as an indication of intensity of the ray we presuppose that:

1. The current is carried through the tube entirely by electrons.

2. That each electron produces only one ether impulse, suppositions that have not been proven.

The results of the experiments may be tabulated as follows:

1. When using a 5 M. A. current, 13.3 milliampere-seconds were required to blacken a photographic plate to a certain

degree. When using 1.9 milliamperes of current, 13.8 milliampere-seconds were required to affect the plate to the same degree. Thus there is an error of 3.7% in the milliampere reading when using comparatively large amount of current (5 M. A.) as compared to the reading when a small current (1.9 M. A.) is used.

2. The effects of 2 M. A. of current from a coil and 2 M. A. of current from a transformer were compared. It was found that with a coil and mercury interrupter (27 pulses per second) 30% more X-rays were generated than with a transformer where the impulses were 110 per second, the milliamperemeter reading 2 M. A. in each instance.

3. In this series of experiments the penetrating power of the tube was measured to avoid the possible source of error in the previous experiment. With the tube of same degree of hardness it was again found that with a milliampere reading of 2 M. A. 25% more X-rays were given out by the coil (slow interruptions) than with the transformer (rapid interruptions).

The author therefore concludes that the milliamperemeter as a measure of dosage must be used with caution. When used under conditions in which the rate of interruption is constant and in which the current reading varies not more than from 1 to 3 or 2 to 5 milliamperes the instrument is fairly reliable.

Intermittent Hour-Glass Stomach.

BY F. M. GROEDEL AND A. LEVI.

The authors speak of the frequency of the occurrence of pseudo-hour-glass contraction of the stomach due to excessive peristaltic activity. From a thorough study of one such case, however, they believe that the condition may be secondary to some perigastric abnormality such as adhesions. In the case quoted, it was apparent that the hour-glass contraction was due to adhesions with colon and liver. Condition appeared when the stomach was empty or partially so and disappeared when fully distended.

Anatomic Subtraction of Hilus Shadows.

BY DR. KUPFERLE.

As a result of 40 experiments upon cadavers the following conclusions are drawn:

1. The shadows are due to both vessels and bronchi at periphery as well as at hilus.

2. The peripheral shadows which are well marked are due to a summation of vessels and bronchi.

Gallstones Diagnosed by X-Ray.

BY DR. F. DE QUERVAIN.

The author reports a case in which gallstones were shown clearly upon the radiogram. Analysis showed the stones to be almost pure calcium carbonate, which is a very uncommon occurrence. By experimental comparison it was shown that the usual types (cholesterin with slight admixture of calcium carbonate and calcium bilirubin stones) are very transparent to the X-ray.

Roentgen Cancer.

BY OTTO HESSE.

Up to 1911, Hesse collected 94 cases of X-ray cancer and allied conditions, 54 were true cancer occurring 13 in Germany, 13 in England, 2 in France, and 26 in America. Only 4 cases followed acute burns or therapeutic exposures. Of the remaining 50, 26 occurred in physicians and 24 in technical workers.

The other cases making up the 94 were 13 doubtful cases and 27 cases of lupus developing carcinoma following X-ray treatment.

The time from beginning of exposure to development of malignancy varied from 4 to 14 years.

Pain was prominent in all cases differing from the pain of the X-ray burn in being more neuralgia-like.

Metastases were less common in X-ray cancer than in the usual type occurring in only 26% of cases.

The mortality in the 54 positive cases was 20%.

The histology of the tumor is given in detail.

The treatment is of course radical removal and the prognosis is not necessarily bad since early operation can usually be done.

The usual protective measures, if carefully observed, may be considered efficient in preventing such injury.

Influence of Roentgen Ray upon Testicles of Rabbit and Rooster.

BY DR. S. HIDA AND K. KUGA.

The following conclusions are given:

1. X-ray acts entirely on the sperm-forming cells producing intense degeneration.

2. The degeneration commences in the cells nearest the tube and progresses irregularly.

3. The degeneration begins in the spermatogenic cells and affects the spermatocytes and spermatids later.

4. The spermatozoa are very resistant and disappear only after the spermatogenic epithelium is degenerated.

No accurate dosage is given. Only the total time of exposure is recorded.

S. LANGE.